CRILE (G. W.)

APPENDICITIS.

Observations on Sixty-Two Operations in the Attack, With Two Deaths.

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(presented)

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APPENDICITIS—OBSERVATIONS ON SIXTY-TWO OPERATIONS IN THE ATTACK, WITH TWO DEATHS.*

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It is not intended in this paper to take up the appendicitis question or any part of it in full, but merely to make some observations based on a personal experience with this disease in its acute form.

Diagnosis.—Fortunately this disease may be in the greater number of cases accurately diagnosed. The most valuable points in diagnosis are the acute pain, the localized tenderness and muscular rigidity; the latter two are so characteristic when properly interpreted as to make them almost diagnostic. Indeed, I do not hesitate to say that in a large proportion of the cases these symptoms are themselves diagnostic. The history of the onset is that of an acute pain, at first referred to the epigastrium or to the umbilicus, later on more marked on the right side in the region of the right illiac fossa. Not infrequently there is nausea and vomiting. The temperature is not of much diagnostic importance, neither is the pulse early in the attack. The tongue merely shows an absorption of toxines, but not indicating the source. Later in the attack, if there is a localized collection of pus, a mass will appear. This mass may be so pronounced as to be made out on inspection. It may nearly always be made out on palpation, but in some cases in which the abdominal walls are thick, it may not be made out until the patient has been reduced to anæsthesia.

When to Operate.—From the literature on the subject, and from my own personal observations, it would seem that the question of operation is largely one of personal judgment. In making up an opinion the history and the nature of the attack, the personal equation of the patient, the circumstances surrounding the case, and ability and surgical appointments of the operator must all be reckoned with. If the patient had previously had an attack of dangerous severity, an operation should be performed on diagnosis. If, after 24 to 48 hours' treatment after the initial symptom, there is no improvement, an operation should be immediately performed. If the onset is characterized by great severity,

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greatly overcoming the patient, operation should be at once performed.

The personal equation of the patient must always be considered. Patients having other diseases, such as acute chronic bronchitis, nephritis, or the various other current general diseases, and patients in the state of pregnancy should be given the non-operative benefit of the doubt. That is to say, if for any reason the subject is not a favorable one for a capital operation, it would seem better to await developments. The circumstances surrounding each case must be reckoned with. Cases not within reach of a hospital, or unable to employ competent nurses, cases in the outlying districts and in the country must be treated accordingly.

Finally every operator must know his own resources to cope with the disease, and be able to estimate closely the chances for success in any given case. A patient may be safe in waiting under the observation of a physician who is able to accurately estimate the status of the disease at every stage of its progress. The refinements in making diagnosis of the exact status of this disease ought to be such as to have the operation performed before an abscess has developed. The abscess stage of the disease may nearly always be sufficiently anticipated to have an operation performed in time to prevent its development.

My particular plea is to not allow the infective inflammation to extend beyond the appendix, more especially not to abscess formation, for then the intermuscular method of opening the abdomen can not with safety be employed, and post-operative hernia, adhesions, and weakened abdominal walls may result. If, however, the right moment is seized, that is to say any time before pus becomes extra-appendicular, the intermuscular method may be employed, and post-operative complications avoided. While thus critically watching a case, the surgeon should be in readiness for immediate operation. Owing to the extremely low operative mortality rate, in the presence of a serious doubt I would operate.

I would especially call attention to a most deceptive and misleading group of symptoms, occurring usually in the second 24 hours, namely: the temperature and pulse may remain about the same, but the pain wholly ceases and the patient feels greatly improved. This may be the lull before the storm. The pain may cease because the appendix is dead. Total necrosis may have occurred, and the beginning of the end may have been inaugurated.

During the stage of critical watching the tendency of the disease while making up a surgical judgment, the use of opium is

to be deprecated, as thereby the symptoms are masked, and the illusive hopes for improvement are only too often shattered.

Another error, too often to the detriment of the patient, is to await the formation of a mass before a diagnosis of suppuration is made. Such diagnosis should be made in advance of that stage of the disease, and when the tendency toward this stage is detected, by means of operation it should never be allowed to develop. Operation in this stage is imperative, no matter what the surroundings or conditions may be. It is this differential handling of the appendicitis question that will yield the patient the best results.

If the non-operative course is at the onset adopted, it should be with a surgeon at the physician's elbow.

There is one group of symptoms I am inclined to believe is too little appreciated, namely the vasomotor. There is no symptom so indicative of the status of the toxaemia as the vaso-motor, and in determining whether a given septic case offers any hope for recovery, the vaso-motor symptoms are of more value than all other symptoms combined. If this system has not gone to dissolution, there is always a chance for success. I have been accumulating experimental and clinical evidence on this subject and will present it more fully at another time.

Operation—Incision.—If there is a reason to believe that there is not extra appendicular pus, the inter-muscular method of McBurney should always be carried out. If there is pus then the incision should be carried down through the structures upon the central portion of the mass. The incision must be made at the point indicated by each case. In two instances I made an incision in the lumbar region; in two cases in the median line; in one case I made incisions in both the left and right sides, and in another case through the vault of the vagina. The incision in a case in which pus is formed may be indicated at almost any point in the lower abdomen. A great deal has been said from time to time on the question of the length of the incision to be made. If there is pus present, and especially if there is a septic general peritonitis, then I think the incision must be made especially long as this is necessary for the treatment of such conditions. Personal judgment and not rules must decide. In all these cases in which drainage is used there is always danger of its being followed by hernia. Now, the discussion of the question of the length of incision to be made in these cases has been rarely taken up, and they are the only class of cases in which such discussion would be of any possible

importance to the patient. In the other method of making incision, namely, the inter-muscular method, there is no chance for post operative hernia. I have repeatedly observed during operations in which the incision was made by the intermuscular method that when the patients were vomiting, if the retractors were removed, and even if no support was given to open the wound, the muscles and the fascia interlock so as to make it impossible even then for the patient in a severe attack of vomiting to force the intestines out. In fact the more the patient strains in vomiting the greater will be the resistance offered by the interlocking structures. In this inter-muscular method, post operative hernia would not occur even if the structures were allowed to come together without sutures. Now, every incision should be made just as long as necessary in each individual case. The abdominal incision must give sufficient room for the operator to properly treat the disease. I was very forceably struck while witnessing an operation by a prominent surgeon in another city who has had a great deal to say about the length of the incision, by the amount of injury inflicted upon the intestines because of the difficulty of delivering the appendix, and when he finally succeeded in delivering the appendix through an extremely small opening the colon was red, intensely congested and bruised, and it looked as though there would be a sharp reaction following. In other words a serious injury was inflicted upon an internal organ so that an inconsequential additional injury might be spared the abdominal wall.

In removing a nominal appendix, or in making an operation between attacks, a very short incision may be made, and very few operators of experience make long incisions in such operations. But in the midst of an acute attack, even though the appendix is not ruptured, and even though there is no extra appendicular pus, the incision should be long enough to give exposure of the field of operation, enabling the surgeon to deliver and remove the appendix with the least possible amount of manipulation and an opportunity for closing over with catgut all the raw spaces after its removal. Ordinary prudence would suggest that the surgeon ought to see the field of such an operative procedure. Now, if there is no chance for hernia, what possible reason could there be for operating in an incision so short as to interfere in the slightest degree with the most advantageous handling of the real field in question, namely, the appendix and the peritoneal cavity. It is important to gently and quickly remove the appendix. The method I usually employ consists in passing a purse string suture

around the appendix after the manner of applying this suture in placing a Murphy button, then cutting off the appendix on a level with the gut, and at the same moment that the purse string is tied, the stump of the appendix in inverted into the gut. If a ligation is made, it is apparent that a part of the infection will remain without drainage into the gut on account of the constriction of the ligature. The purse string treatment cleanly and quickly disposes of the stump. Next in importance to the proper disposal of the appendix is the treatment of the peritoneal field of operation. All raw spaces in the peritoneum should be closed over by means of cat gut sutures, and if this cannot be done on account of the swelling and oedema of the peritoneum omental grafts may be substituted. The wound should never be closed until all oozing is stopped, and oozing rarely occurs after the raw surfaces are closed. In closing the wound in the abdominal wall, if made by the inter-muscular method, one strand of catgut is sufficient, beginning with the peritoneum bringing it together, then in turn the various muscular and fascia layers and finally the skin. If an abscess has formed it is very important to remove the appendix at the time of operation, otherwise there is likely to be recurring attacks. I have usually found it quite easy to identify and remove the appendix in these cases.

Drainage.—In all cases in which there has not been extra appendicular pus, if the technique included the inversion of the stump of the appendix without ligature, and included the covering of all raw spaces in the peritoneum, no drainage is necessary. These various requirements may be made in every case in which there is no extra appendicular pus. If there is extra appendic pus it is safest to drain. I have been inclined to believe that it is best to leave the wound well open and drain from its deepest portion by means of long pieces of gauze gently inserted to the bottom and allowed to lap well over the patient's side. A sufficient number of such pieces of gauze should be so inserted as to drain every portion of the peritoneal cavity involved. Over this drain an ample, moist, sterile water dressing is applied, and finally upon this dressing, light hot water bags are placed. The dressings are moistened three to four times a day so that by this method moist heat is applied to the wound without annoyance to the patient. These long drains exert a syphon action and are not to be compared in their efficiency with the inefficient, short drains, cut off close to the wound. Just as soon as healthy granulations have formed throughout the wound, and the wound even if left to nature will

close with wonderful rapidity, then by means of cocaine I make secondary sutures of the wound. I regard this as being a method preferable to that of closing the wound and inserting tubular or other drains. As soon as the patient has sufficiently recovered from the operation, one-tenth of a grain of calomel is given every fifteen minutes until one grain has been taken, after which a teaspoonful of Epsom salts in hot saturated solution is given every half hour until four doses have been taken. If after the second hour after the last dose a movement of the bowels has not been accomplished, then injections are administered. Until the bowels move nothing is allowed by the mouth. During the entire convalescence the patient's bowels are closely attended to. There are innumerable points in the after treatment of these cases into which I cannot at this time enter.

Among the cases treated were four of acute septic general peritonitis due to fulminating appendicitis, all of which recovered. In none of these cases were there any adhesions whatever, and the abdominal cavity was full of pus. In one case the abdomen was enormously distended with pus, the pulse was 164. The other cases contained less pus, but the pus was free in the abdominal cavity. There was not an adhesion to be found, and the appendix in consequence was easily and quickly removed. The treatment in these cases consisted in making very wide and extensive incisions, in holding apart the walls, in pouring in quantities of normal salt solution and washing out as much of the pus as possible, then taking long pieces of gauze, one end being carried in among the coils of the intestines in all portions of the abdominal cavity, then the free ends brought out and laid across the abdomen down over the sides. In this way when finally all the drains had been applied, the whole abdomen and the sides of the patient were covered with these long capillary drains so as to give the patient the appearance of a huge crysanthemum. It seemed at the time in each case that it would be impossible to keep the intestines within the cavity, but as soon as such drains are systematically inserted, their adhesion to the intestines hold the latter in place. The whole abdomen of the patient is enveloped in an enormous, warm, moist dressing of a solution of 1-10000 of bichloride. This solution was applied several times during the day so as to keep all the dressings moist. Hot water bags were applied over all so as to place the entire abdominal cavity and the abdominal surface in contact with moist heat continually. The patient's bowels were opened as soon as possible, and a number of

free movements secured. In these cases, the subjects hovered between life and death for from three to five weeks, but finally recovered.

Of the two deaths referred to, one was a case I saw through the courtesy of Dr. Perrier. The patient was a little child four years old who had been subject to convulsions. He died the second night after having convulsions continuously for more than four hours. The operation had been a very easy one as the patient had had the attack for about ten days and there was a completely walled off localized abscess. There was nothing during the operation, nor subsequent to it up to the time of the onset of convulsions, to indicate anything but a favorable termination. The other case was one that I operated on by the courtesy of Dr. Woessner at Huron, Ohio. The patient lived in the country. The diagnosis of appendicitis was made early, and an operation was recommended by the doctor. This proposal was rejected by the patient and his friends. After about three weeks of illness he was reduced to a state of profound sepsis. The abdomen contained many pockets of pus between the coils of the intestines. The operation was made as quickly as possible and these various cavities were drained. In the night after the operation the patient died rather suddenly.

If in a series of operations in the attack, cases unselected, including the fulminating variety and septic general appendicitis, in the young and in the old—if in such a variety of cases, the mortality rate is but a trifle above 3 per cent, there could be no doubt so far as my personal experience is concerned that it is advisable to operate early in suitable cases and in many as soon as the diagnosis is made. In operations between attacks there should be rarely a death.

I would, in closing, lay stress upon the employment of a technique whose aim is the performance of this operation completely, concisely, and quickly, so that both shock and infection may be minimized.

DISCUSSION.*

Dr. Chadwick: I would have liked very much to have heard this paper. Those cases which I have seen of my own have been five in number, five which I could prove as appendicitis, two of which we held post-mortem examinations upon, and three which

*May L. Bassett, Medical Reporter.

were operated and recovered. My judgment would be that if it was my own case I should wish to be operated upon as soon as possible.

Dr. Campbell: I do not know as I would approve of operating in every case. My reason for not approving is that I have had cases of appendicitis which have not been operated and yet have recovered. I cannot see why we should weaken the abdominal walls by operating when the patient might recover without. I believe an early diagnosis is necessary, that is, an early diagnosis for pus, and if we find pus or a suspicion of pus then operate. I do not believe in indiscriminate operating.

Dr. Powell: I came here to-night especially to hear Dr. Crile's paper, not having anything to report for myself. Dr. Crile's paper on appendicitis is one that all general practitioners are decidely concerned in. In fact, I am now treating a case of appendicitis. Ever since operations began for appendicitis I have been deeply interested in the subject. I remember to have made post-mortems on such cases twenty years ago, when very much less was known of the disease and its management. I do not think cases are any more frequent now than formerly. I do not see why they should be. We eat about the same kind of food and have not changed as to our anatomy. But such an advance has been made in surgical work that this operation is on a firm foundation, and it impresses itself so favorably upon the general practitioner that it has become a very delicate question for him to decide how far he can treat such cases medically. I do not care who the practitioner is,—if anything goes wrong with his patient, he is in a bad position. The laity are all aware of the fact that it is a comparatively safe operation. Many feel the same about it as they do about going down to be vaccinated. They do not even say, "Is it likely to give me blood poison or will it leave a bad scar?" Where one has an attack and gets over it, he makes an appointment with some surgeon for an operation. A few days ago a gentleman came to my office who had lost his wife recently from an operation for appendicitis. He did not think that appendicitis was ever a dangerous operation. He said to me, "Doctor, did you see that article in the paper about an operation for appendicitis? It said that the operation was a perfect success but the patient died. They said the same thing about my wife, and I don't understand it." Well, I had seen a similar statement about two other cases. Both operations had been successful, but the patient had died. Now people cannot see how this is. Of course

it is not much trouble for a physician to see through this, but the people cannot understand it! People are stupid, anyway! Now to come down to facts, I have treated a number of people with typical attacks of appendicitis who have entirely recovered. I can recall a number along back through the years. I have seen one case to-day, that of a person under twenty years of age, and in fact about fifty per cent. of the cases are under twenty. I was called to see this young man four days ago. He was enjoying perfect health when taken with this, his first attack of appendicitis. The case has been typical from the start, if we can apply the term typical to a person with so many varieties. The pain in the right iliac region was severe, especially under McBurney's point, requiring a grain and a half of morphine to give him relief, tenderness on percussion with tension of the muscles, and a temperature of 102 degrees. I put the patient under my usual treatment, morphine, the application of hot poultices and the administration of a large enema. This has been followed up under the care of a trained nurse,—absolute rest and a liquid diet being insisted upon. The case has been progressing favorably, and I have every reason to anticipate a perfect recovery. I sometimes vary the treatment by the use of ice poultices suspended in a small hammock over the patient. I do not give cathartics but make use of daily enemata. This, I believe, does not differ materially from the practice of most medical men. If improvement had not followed the treatment, but on the contrary the symptoms had become aggravated, indicating the ulcerative process, I should have called a surgeon in consultation. This, I believe, to be a case of simple catarrhal appendicitis, an exceedingly frequent form of the disease, which will be cured in the vast majority of cases by medical means. According to the statement of Dr. Crile, all such cases should be operated immediately after diagnosis for fear of recurrence of the attack. I differ with the Doctor in this opinion. The patient is entitled to the benefit of the doubt. General practitioners see many more cases of appendicitis than surgeons do, and are equally expert in the diagnosis of the disease. They have cured many cases in the past, and are certain to cure many more, if not deterred from treating them when the conditions justify medical treatment only. Good judgment based upon experience will enable the practitioner to call the surgeon at the proper time in a majority of cases; for one, I consider it unjust to be thus embarrassed, and believe it will not be long before the surgeon will modify his views, and relieve practitioners of the embarrassment

they have given us. Much could be accomplished toward bringing this about, if we could get accurate statistics as to the number of appendices, in normal condition or slightly catarrhal, removed by surgeons. Unfortunately, such cases are not reported. The wholesale removal of ovaries has been stopped, and it will be next in order to protect the appendix. But it is not my intention to be hard upon the surgeon. I entertain great admiration for him and his marvelous accomplishments. I may need his services within twenty-four hours. I do not want him to be very far away from my case of appendicitis, but I do not want him to hang around the case from the first.

Dr. John P. Sawyer: I do not believe that appendicitis is such a clinical entity that we are justified in assuming any such general rule in regard to the time to operate as that it should be done when the diagnosis is made. We hear in our societies, and read in our journals, that operation is the necessary sequence to diagnosis, and we hear it from men who are high in our regard, and stand among the highest in the profession, and yet I think it a too sweeping conclusion. There are cases in which, when the physician is called, he finds that there is no possible delay; indeed, it is a time when the patient grows so rapidly worse that the moments which pass grow to be ages to the waiting physician before the arrangements can be completed for operating, and relief can be obtained.

I remember the case of a busy man of affairs, who called me to his store and wished me to treat him for stomach ache, and let him go on with his business. The case had then reached so severe a stage that I sent him home, and had him operated immediately, removing a large quantity of pus. The case is one of those occurring in men so strong that they continue with their business even while developing rapidly a condition of extreme danger, requiring immediate operation.

Concerning these fulminant cases there can be no debate, nor is it best to obscure our discussion by continuing to hold this group of cases in our view.

Of the less threatening, and more slowly developing cases of inflammation in the right iliac fossa, there are many which do not come under the eye of the consulting surgeon. This important fact must not be lost sight of when reading the statistics of operators. It is customary for surgeons to report so many operations for appendicitis, and so many recoveries. And to the credit of surgery and of operative interference, let it be well rec-

ognized that the lives saved are a large proportion of the cases upon which operation is done.

But while the surgeons are operating their tens of cases, the physicians are busy with scores, of whom a large proportion are never seen by operators whose statistics make a large part of the figures from which it is sought to deduce with mathematical inflexibility the proposition that when appendicitis is diagnosed medicine has no longer any place, and that the knife is the only resort.

It is not good reasoning to neglect some of one's premises and reach conclusions from only a portion of the facts which may be known by the reasoner concerning the subject of his thought. It will not do to paint the horrible aspect of affairs when a fulminant case of appendicitis is said to be masked with opium and grown under an iceberg, and hold up the canvas covered with these sombre hues as the natural result of the medical treatment of any case of appendicular inflammation.

The experience of physicians before operation came in vogue is borne out by the experience of physicians in these latter years. There are many cases of well marked inflammation process in the right iliac fossa, whose progress is that of a climax reached and resolution obtained without the necessity, or advantage of surgical intervention. These cases, I repeat, the surgeon sees but seldom, and seldom realizes the number which the physician has seen, under his much decried measures of ice and opium, pursue a favorable course, obtaining complete recovery.

It is just as poor reasoning to allow this group of cases to dominate the physician's reasoning as it is for the surgeon to allow the fulminant case to blind him to the existence of the very many cases he sees but occasionally.

Between these two groups lies the great body of cases over which there is still the shadow of uncertainty, and concerning which this most eager discussion of our day is so actively carried on.

The surgical rules of operation when the well-trained judgment decides upon the presence of pus, is one of the few fixed points on which we may all agree. But when the surgical position thus becomes the point of view, it is of greatest importance for the correct estimate of cases, not to neglect the equally imposing statistics of the vast institutions under men like Ewald, Renvers, Korte, Frankel and Stadelmann. Their experience is the more impressive to me, because of the reliance I place upon their

opinions through some slight opportunity to personally know of their methods, and their cautious, conservative judgment. For example, of 172 cases received at the Department of Internal Medicine in a great hospital, 40 were sent to operation. Of the remaining 132 retained in the Department of Internal Medicine, 16 cases died, of which 16 charged to the internal medical treatment 14 were received with general peritonitis, and were not suitable cases for even the most eager surgeon to operate, leaving but 2 deaths in 118 cases. It is well in the face of such results to stop and ask if conclusions can be sound which state that operation should be done when the diagnosis is made. For my part I do not believe it, nor do I think that it will be charged to me by my surgical colleagues that I am slow in deciding upon the desirability of an operation.

Let me repeat that in speaking against operation and diagnosis as being synonymous surgical terms, I am only speaking for the necessity of individual study in each case, and each physician must decide in a particular case whether the condition calls for operation. If an operator holds the view that operation must be done in all cases, the physician in calling that operator ceases to be an adviser in the case. His advice is given when the operator is called. Real consultation is not held under such conditions. And I think the statistics reported by Sahli with a total mortality of 9½ per cent. in more than 7,000 cases (and as examples of other internal clinics, Renvers reports 96 per cent. recoveries in 2,000 cases, Curschmann and Aufrecht report 95 and 95½ per cent. recoveries), are statistics which demand from our operators more respectful attention than is accorded by some men whose prominence in the profession is so great that we rightfully expect from them a degree of tolerance for others' opinions, and a recognition of the excellence of others' methods, which the frequently repeated proposition referred to so frequently fails to accord. The statistics can not be accepted for face value, for they contain certain sources of error, but inasmuch as they convincingly demonstrate that many cases recover without operation, it becomes the duty of the physician to make his diagnosis, treat his patient, if the condition permit the instituting of measures of internal medicine, and then in the case of their faliure to decide upon the necessity of operation. The surgical treatment of appendicitis begins when the medical handling of the case is progressing unsatisfactorily, and the combination of results of both disciplines is essential in establishing a well-rounded plan capable of general applica-

tion in the experience of thousands of physicians who have to meet the most anxious responsibilities which this dreaded affection places upon them.

Dr. H. J. Herrick: There are one or two points that occur to me in this discussion. In the first place, it is very difficult to obtain statistics that are reliable. I have the following statistics, which I will report on a case that came to me. Its history was that of an operation for appendicitis with recovery. It was operated again for adhesions and incomplete union of abdominal wall. And after all that, came into my hands with recurring attacks of colitis. He grew better, then worse. It seemed best to call a surgeon again, and the third operation was performed for appendicitis. He finally had a fecal fistula and died six months afterward. It was one of the most pitiful cases I ever knew. He was a bright college student, with strength and vigor, and I am satisfied that his death was due to the weakening of the abdominal walls by an operation that might have been avoided. The result of this first operation, instead of revealing pus, showed that the cause of the attack was a contracted appendix. From cases I have seen since I am satisfied that if the young man had not had an operation he would have recovered. He ought to have recovered from the attempt that Nature had made to help him to health again. It is difficult for a practitioner to decide what to do, but with all that may be said upon both sides I could not take the position of absolute operation. I have seen a large proportion of cases of appendicitis and am convinced that most of them would recover without operation. The point I wish to make is that all cases that are operated upon, not every one that survives the operation is relieved of the diseased condition, or he may be left a partial cripple.

Dr. C. W. Smith. I would like to ask Dr. Crile to state, if possible, in what proportion of cases Nature walls off the abcess with a spontaneous rupture into the intestinal canal. Also, as to his views relative to the symptoms produced by different forms of bacteria.

Dr. Herrick. Do fulminating cases always commence with rupture of the appendix?

Dr. Crile. In the comparatively recent extension of the sphere of surgery in the treatment of appendicitis, I do not think there is any intention of impunging medicine. Inasmuch as the discussion has followed principally along the line of the consideration of the time to operate, I may reply in a general way without

referring to the principal points made by each of the gentlemen who have been good enough to discuss the paper. Replying to the question asked by Dr. Smith, I am not aware of any reliable statistics as to the number of cases that are walled off and the abscess finally ruptures into the intestinal canal. This termination I am inclined to believe occurs fairly frequently in the long drawn-out cases not cured by medicine nor subjected to operation, and which finally recover. Oftentimes the beginning of the recovery is marked by the feeling of something giving way and the discharge of considerable pus from the intestinal canal. It has occurred to me that the cases in which the appendix lies bent back underneath the colon are most likely to terminate in this way. I have in operations encountered cases in which the abscess was lying just behind the colon, and the walls of this structure were so oedematous and necrotic that perforation was at the time imminent. I could easily understand how the completion of this perforation might be made. As to the symptoms produced by the different varieties of bacteria, I would say that in the case of the colon baccillus the abscess is much more likely to be walled off, because the process is neither so rapid in its development nor so virulent, and as a rule the cases are not so severe. The same may be said of staphylococus infection. The foul smelling absceses usually contain colon baccilli; the streptococcus infections progress with wonderful rapidity, are apt to produce general peritonitis and constitute the gravest forms of this disease.

Replying to Dr. Herrick, I am of the opinion that fulminating cases commence with rupture of the appendix, exposing thereby the peritoneal cavity to the infection. I have operated on a number of cases, comparatively early in the attack, in which localized necrosis of the entire wall of the appendix had taken place and perforation would have been complete within a relatively short time. I have operated also in cases in which perforation had just occurred. I am very much interested in the statistics presented by Dr. Sawyer.

My present view of the case is that if the patient is in the hands of a physician who is diligent enough and sufficiently acquainted with the symptoms to make out the trend of the disease, as to whether it will be amenable to medical treatment or not, and who is able to point out the hour at which medical treatment is no longer safe and surgical treatment should be given, such cases are safe in such non-operative care. As a rule this decision will be reached within twenty-four to forty-eight hours after the initial

symptom. There are many exceptions, however. In cases of doubt I would operate. An operation performed sufficiently early is always safe, but a delay may be dangerous. I would argue very strongly against the practice of giving opiates for the relief of pain during that stage of the disease during which the patient should be seen every hour or two and during which there is critical watching for the purpose of seizing the hour at which the operation should be performed. It is much better to have the patient endure some pain than to mask the symptoms with opiates. If it is decided from the first that the case is not surgical in any event, then I waive the point as to opium.

There is so much that I feel like saying on this question, and there are so many views of it into which we can not now enter, that I will not continue the discussion at this time.

I wish to express my appreciation of the discussion of this subject by the medical gentlemen, and wish to give them my assurance that I am always ready to be instructed by their observations and opinions from their side of the question.